

## What Is Claimed Is:

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- 1 1. A MOS (metal on semiconductor transistor) structure for ESD protection, comprising:
  - an active region, defined on a substrate of a second-type
     conductivity;
    - a channel region separating the active region into a first drain/source region and a second drain/source region;
    - at least one first island, formed on the first drain/source region and having a first conductive segment and a first gate oxide segment of the first thickness, the first conductive segment being stacked on the first gate oxide segment;
    - a doped drain region of a first-type conductivity in the first drain/source region, defined substantially by a field oxide region, the channel region and the at least one first island; and
    - a breakdown-enhanced layer, formed in the first drain/source region and contacting the doped drain region, to reduce a breakdown voltage across the doped drain region and the substrate.
  - The MOS structure as claimed in claim 1, wherein the MOS structure has, within the active region, two breakdown-enhanced layers with the same depth and the same dosage, and one of the breakdown-enhanced layers is inside the first drain/source region while another is outside the first drain/source region.

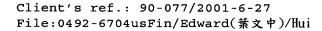
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- 1 3. The MOS structure as claimed in claim 1, wherein the breakdown-enhanced layer has the first-type conductivity.
- 1 #. The MOS structure as claimed in claim 1, wherein the 2 breakdown-enhanced layer also forms pocket-implanted 3 structures of internal MOS.
- 5. The MOS structure as claimed in claim 1, wherein the breakdown-enhanced layer has the second-type conductivity.
  - f. The MOS structure as claimed in claim 1, wherein the breakdown-enhanced layer also forms anti-punch-through structures of internal MOS.
  - The MOS structure as claimed in claim 1, wherein the breakdown-enhanced layer is formed under the doped drain region.
  - 8. The MOS structure as claimed in claim 1, wherein the channel region has a gate structure consisting of a second conductive segment and a second gate oxide segment, the second conductive segment being stacked on the second gate oxide segment.
- 1 9. The MOS structure as claimed in claim 8, wherein the second 2 gate oxide and the first gate oxide have the same thickness.
- 1 10. The MOS structure as claimed in claim 8, wherein the second 2 gate oxide and the first gate oxide have different 3 thicknesses.



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- 1 11. The MOS structure as claimed in claim 10, wherein the second 2 gate oxide is thicker than the first gate oxide.
- 1 12. The MOS structure as claimed in claim 11, wherein the
  2 breakdown-enhanced layer is formed at the at least one first
  3 island breakdown-enhanced layer and an internal-circuit MOS
  4 transistor with the first gate oxide thickness
  5 simultaneously.
  - 13. The MOS structure as claimed in claim 1, wherein the breakdown-enhanced layer is not formed in the second drain/source region.
  - 14. The MOS structure as claimed in claim 1, wherein the channel region has a field oxide stacked on the substrate.
  - 15. An electrostatic discharge protection device on a substrate of a second-type conductivity, comprising:
    - a source region of a first-type conductivity, coupled to a power rail;
    - a drain region of the first-type conductivity, coupled to a
       pad via a contact;
  - a first gate structure placed between the source region and the drain region, for controlling electric connection between the drain region and the source region; and
- a second gate structure substantially surrounded by the drain region, for distancing the contact from the first gate structure;

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- wherein the first gate structure and the second gate
  structure receives different implant treatments.
- 1 16. The electrostatic discharge protection device as claimed in 2 claim 15, wherein the second gate structure distances the 3 contact from the first gate structure.
- 1 17. The electrostatic discharge protection device as claimed in claim 15, wherein the first gate structure includes an adjacent first doped junction; the second gate structure includes an adjacent second doped junction; and the first and second doped junctions have different doping profiles.

  18. The electrostatic discharge protection device as claimed in claim 15, wherein a gate oxide of the first gate structure
  - 18. The electrostatic discharge protection device as claimed in claim 15, wherein a gate oxide of the first gate structure and a gate oxide of the second gate structure have the same thickness.
  - 19. The electrostatic discharge protection device as claimed in claim 15, wherein a gate oxide of the first gate structure and a gate oxide of the second gate structure have different thicknesses.
- 20. The electrostatic discharge protection device as claimed in claim 15, wherein the gate oxide of the first gate structure is thicker than the gate oxide of the second gate structure.
- 1 21. The electrostatic discharge protection device as claimed in 2 claim 15, wherein the second gate structure receives 3 breakdown-enhanced implantation while the first gate

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- structure is sheltered from the breakdown-enhanced implantation.
- 22. The electrostatic discharge protection device as claimed in claim 21, wherein the breakdown-enhanced implantation is pocket implantation to form pocket-implanted structures.
- 23. The electrostatic discharge protection device as claimed in claim 21, wherein the breakdown-enhanced implantation is anti-punch-through implantation.
  - 24. The electrostatic discharge protection device as claimed in claim 21, wherein the breakdown-enhanced implantation is to form a breakdown-enhanced layer under the drain region.
  - 25. The electrostatic discharge protection device as claimed in claim 24, wherein the breakdown-enhanced layer has the second-type conductivity.
  - 26.An electrostatic discharge protection device, comprising:
- 2 an active region on a substrate of a second-type 3 conductivity;
- a first gate structure and a second gate structure, both being placed on the active region;
- at least one drain region of a first-type conductivity and one source region of the first-type conductivity, defined and separated by either the first gate structure or the second gate structure; and



- a breakdown-enhanced layer, formed within the drain region to reduce a breakdown voltage across the drain region and the substrate.
- 27. The electrostatic discharge protection device as claimed in claim 26, wherein the at least one drain region and one source region are respectively coupled to a pad and a power rail.
- 28. The electrostatic discharge protection device as claimed in claim 26, wherein the breakdown-enhanced layer is not present within the source region
  - 29. The electrostatic discharge protection device as claimed in claim 26, wherein a gate oxide of the first gate structure is thicker than a gate oxide of the second gate structure.
  - 30. The electrostatic discharge protection device as claimed in claim 26, wherein the first gate structure separates the active region into two drain/source regions as well as the second gate structure does.
- 31. The electrostatic discharge protection device as claimed in claim 26, wherein the breakdown-enhanced layer has the first-type conductivity.
- 32. The electrostatic discharge protection device as claimed in claim 31, wherein the breakdown-enhanced layer also forms pocket-implanted structures of internal MOS.

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- 33. The electrostatic discharge protection device as claimed in claim 26, wherein the breakdown-enhanced layer has the second-type conductivity.
- 34. The electrostatic discharge protection device as claimed in claim 26, wherein the breakdown-enhanced layer also forms anti-punch-through structures of internal MOS.
  - 35. The electrostatic discharge protection device as claimed in claim 26, wherein the breakdown-enhanced layer is formed under the doped drain region.